Giant Cell Tumor-like Lesions of Bone

A Preliminary Report of a Pathological Entity

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• **In three cases of a giant cell tumor-like lesion of bone, the histological characteristics of the lesions were a fibrogenic stroma, capillaries, thick-walled blood vessels, multinucleated giant cells, osteoid tissue and bone trabeculae.**

It is believed that tumors of that kind are another giant cell variant that should be separated from the true giant cell tumor if for no other reason than the favorable response to conservative surgical therapy.

GIANT CELL TUMOR is a debatable neoplasm and since it was first described there has been a variety of opinions regarding the nature of the lesion and as to etiologic factors. There have been three schools of thought: (1) That it is a benign tumor and does not metastasize (Bloodgood[1]); (2) that it is of traumatic origin and not a tumor (Martland[8]); (3) that it is a true tumor, usually benign but capable of an unpredictable and adverse biological behavior[2,6] (Jaffe, Portis and Lichtenstein, and Coley).

It is difficult to get definitive histological criteria, for in much of the early material reported some of the finer microscopic detail was neglected. However, Codman recognized that true giant cell tumors did not have thick-walled blood vessels and Ewing[3,4] stated that bone was regularly absent. Both Williams, Dahlin and Ghormley,[12] and Jaffe, Lichtenstein and Portis[6] noted osteoid formation.

There is no unanimity of opinion as to the anatomical sites at which these lesions may be located. Furthermore, there are many investigators who would include the giant cell lesions of the jaws as a giant cell tumor (Bloodgood[1]). In 1953, Jaffe[5] described the giant cell lesions of the jaws as "giant cell reparative granuloma" and said he had never seen a true giant cell tumor of the jaws. Jaffe also observed a similar lesion of a cervical vertebra. Furthermore, he was unable to differentiate either the peripheral or central type of this lesion from the one appearing in some cases of hyperparathyroidism. The same condition, according to Jaffe, is characterized at the Armed Forces Institute of Pathology as the "giant cell lesion."

It is the purpose of this report to call attention to some giant cell lesions of bone which frequently, but not necessarily, occur in persons under the age of 20 years; which usually occur in other than, as well as in, long type bones, and which have histologic structural characteristics not present in what are considered to be true giant cell tumors. The authors believe that these lesions are histologically the same lesions as are found in jaws and at times in the vertebrae and that have been termed "giant cell reparative granuloma." To illustrate these giant cell lesions, three representative examples have been chosen, one at the lower end of the radius, one in the talus and one in a vertebral body. Diagnosing these lesions offers no problems when there is adequate material available. The authors believe that they are benign but are uncertain as to whether they are neoplastic or granulomatous.

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REPORTS OF CASES

CASE 1. A 17-year-old white boy was first seen at the Orthopaedic Hospital, Los Angeles, on April 19, 1954, with complaint of pain in the left foot and ankle that followed a sprain in 1952. It was not until several months after the injury that swelling and pain developed in the medial aspect of the foot. He then sought medical attention. An x-ray film was taken, which was stated to have shown a fracture. Palliative treatment was given. In June, 1953, at another hospital a biopsy and a bone graft were done and the patient then wore a cast for three months. When observed in the Orthopaedic Hospital a second time in June, 1954, biopsy and x-ray (Figure 1) examination of the lesion were carried out and a diagnosis of aneurysmal bone cysts was made. Roentgen therapy was begun to halt further progress of the lesion, but the growth persisted (Figure 2). On January 14, 1955, the defect was curetted and bone chips were placed in the cavity. The previous biopsy was reviewed together with the more adequate tissue removed by curettage and a diagnosis was made of "giant cell reparative granuloma." (Figure 3).

CASE 2. A 34-year-old white woman entered White Memorial Hospital because of pain between the

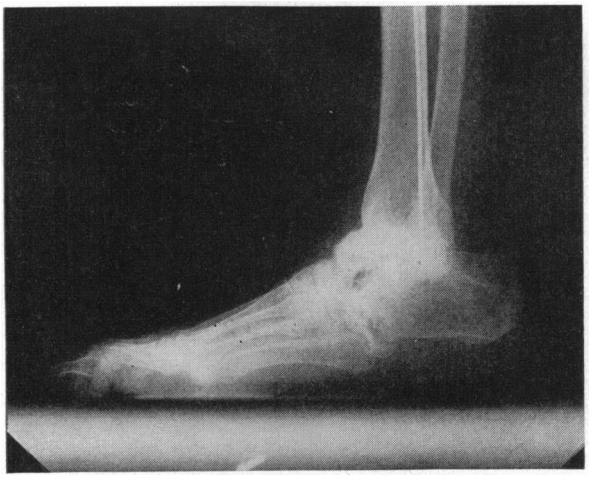

Figure 1.—Osteolytic and expanding lesion, anterior portion of talus.

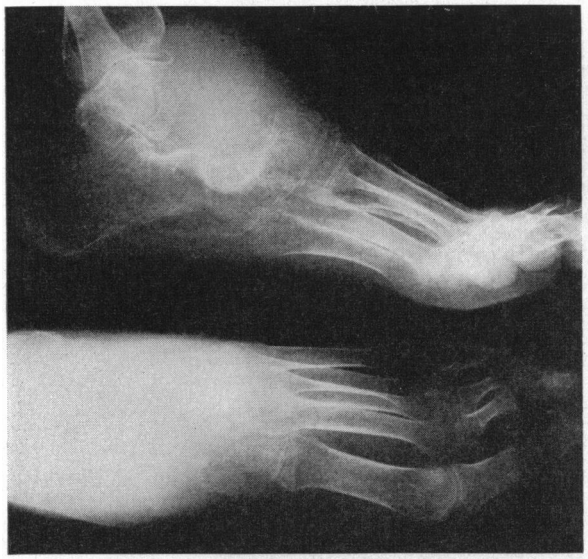

Figure 2.—Appearance of same lesion approximately four months following biopsy and x-ray therapy.

scapulae of five months' duration. There was tenderness in the back at about the level of the eleventh thoracic vertebra, and an x-ray film (Figure 4) showed an osteolytic lesion of that segment. There were no gross motor or sensory abnormalities except some weakness in the lower extremities. Laminectomy was done October 6, 1955. A tumor that was destroying the eleventh thoracic vertebra and extending into the spinal canal was observed. After curettage and laminectomy, the patient felt well for three months. Backache then recurred at the previous site and the patient also noted weakness and paresthesias of the lower extremities. She was readmitted to hospital in January 1954. On physical examination, sustained bilateral ankle clonus was observed. Operation was carried out and part of the vertebral body of the eleventh thoracic segment was removed and the spinal cord was completely decompressed.

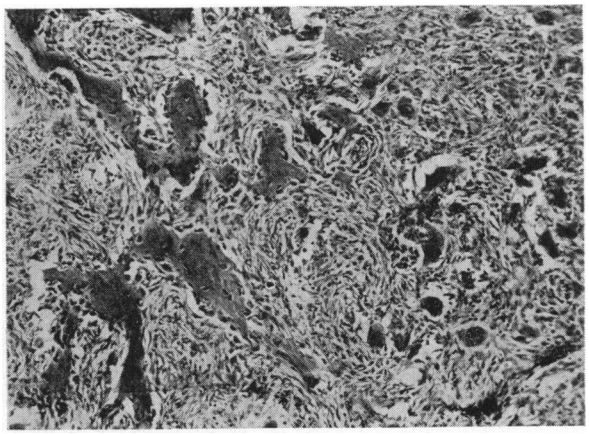

Figure 3.—Note the characteristic size and shape of the giant cells, the loose small spindleoid cell stroma and the fiber bone (×125).

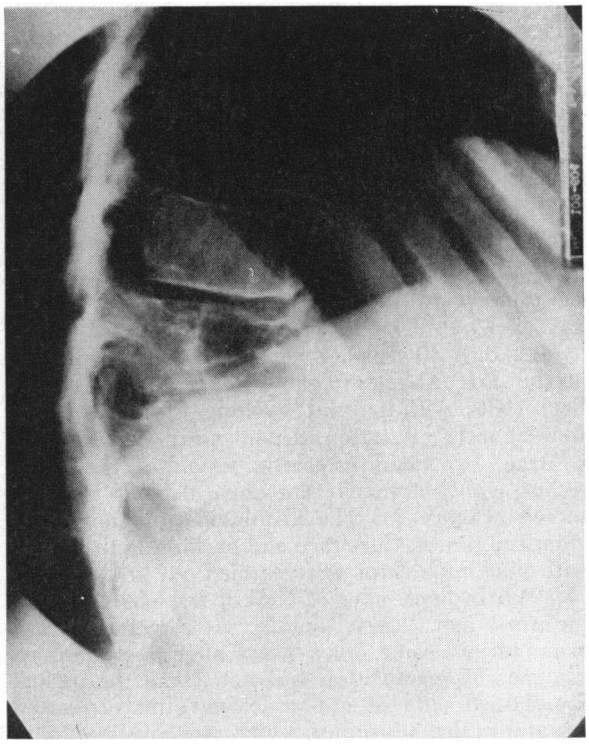

Figure 4.—Osteolytic lesion anterior portion of 11th thoracic vertebra, secondary compression of anterior portion with degenerative change about joint space.

The patient went into shock and it was deemed inadvisable to continue the fusion aspect of the operation and the rest of the resection of the tenth and eleventh vertebrae. The tissue removed at the various operations was essentially the same (Figures 5 and 6). Operation was done again on February 14, 1956, a small residual portion of the tumor and a considerable amount of scar tissue about the cord were removed, as were the remaining portion of the eleventh and half of the twelfth thoracic vertebra. The patient was placed in a cast and when last observed, November, 1956, was walking.

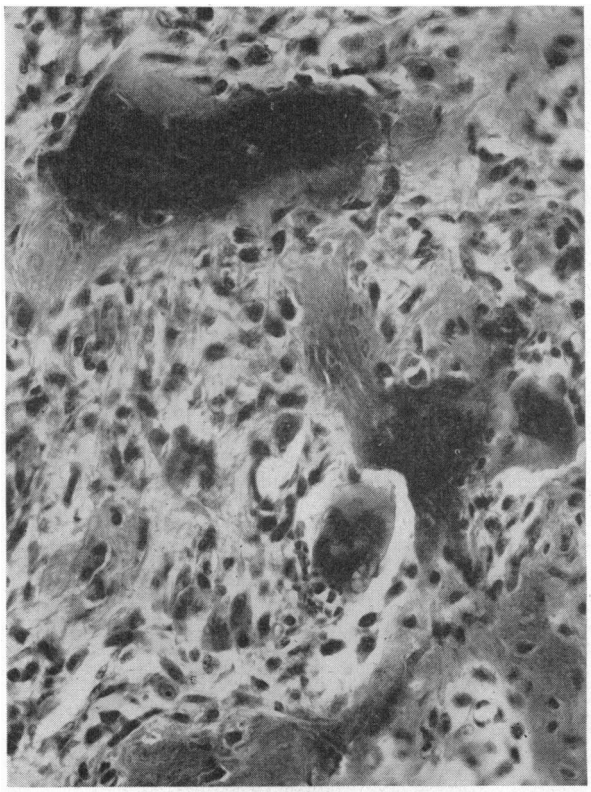

Figure 5.—Note the bony trabeculae with osteoclast and collagenized stroma from original biopsy (×300).

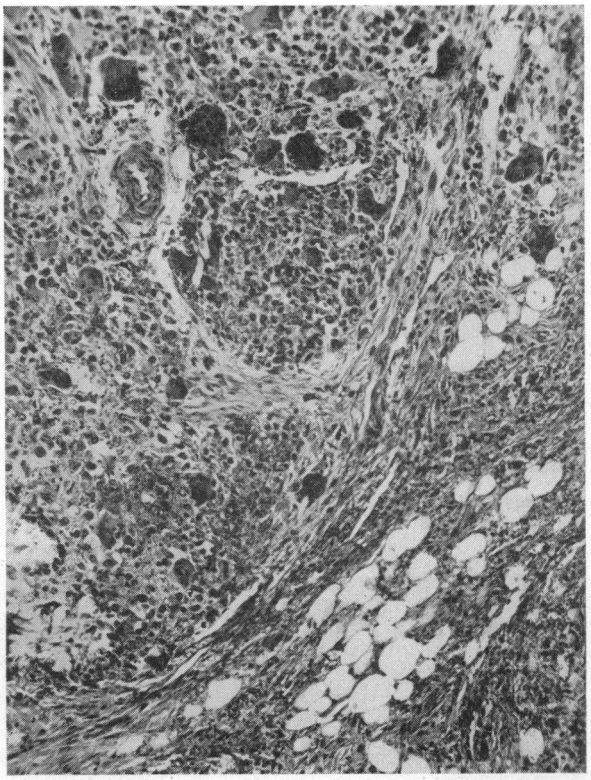

Figure 6.—Soft tissue extension at time of second operation (Case 1) (×300).

CASE 3. A 30-year-old negro woman was first seen at the Los Angeles County Hospital in November, 1949, with painful swelling of the wrist of four months' duration. Upon x-ray examination, a large, expanded osteolytic lesion of the distal radius with extremely thin cortical walls was observed (Figure 7). The histological diagnosis was giant cell tumor. Curettage and packing of the cavity with iliac bone chips were carried out in December of 1949. In September of 1951 it was observed that the graft had "taken" solidly. At the time of last examination, some seven years after operation, no evidence of reactivation was noted and the patient complained only of minor aching after prolonged use and in damp weather, which was consistent with traumatic arthritis at the radiocarpal joint. Upon review the diagnosis was: Giant cell reparative granuloma. (Figures 8 and 9).

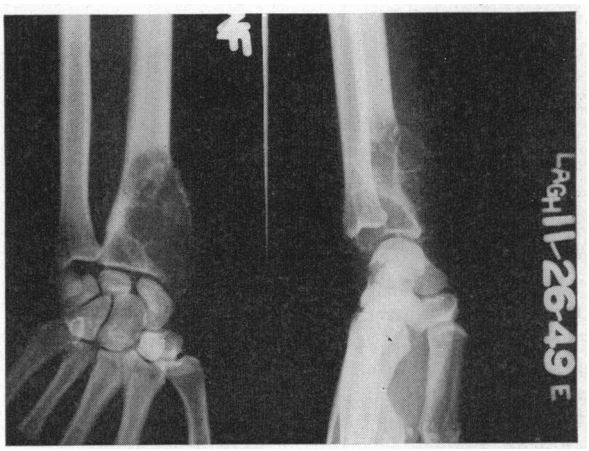

Figure 7.—Osteolytic lesion distal radius expanding cortex with cystic trabeculations.

PATHOLOGY

The tissue that is removed from lesions of the kind under discussion may be quite indistinguishable from material curetted from true giant cell tumors. On the other hand the tumor may, like the peripheral and central giant cell tumor of the jaws (so-called), contain obvious bone. The structural characteristics of the giant cell lesions described here are those of a spindle and giant cell growth, with the fibroblast much like that seen in reparative granulating tissue and such lesions as infiltrating fascitis rather than the round plump cell seen in true giant cell tumors. Other features are the large amounts of intercellular collagenic tissue, the characteristic thick-walled blood vessels, and the osteoid formation as well as the spicules of bone of the coarse fiber type. These are not situated at the periphery, and if they are the result of hemorrhage and necrosis there is no residuum to indicate that such might be the case. In most of these prolifera-

tions, if adequate sections are taken, at least osteoid tissue will be found, sometimes in scattered foci, sometimes in quite large amounts, and in some proliferations coarse fiber bone will be present. The spindle-cell element has variable numbers of giant cells and these are quite often indistinguishable from the giant cells in true giant cell tumors. However, many of the giant cells even in the closely packed spindle-cell areas have a clear space around them. This clear space is apparently due to shrinkage, but it is a constant artefact not usually noted in the closely packed portions of a true giant cell tumor. Also, the giant cells have a tendency to irregularity of shape, with the syncytial cytoplasmic border of the giant cell oftentimes sharply angulated. The number of nuclei is not nearly as uniform as in true giant cell tumors. At the border of these lesions the connective tissue is often well vascularized and is more mature looking with lesser density of spindle and giant cells, and the confining bone appears to be absorbed by vascular resorption rather than by actual giant cell invasion. However, there were a number of areas in which spindle-cell connective tissue with giant cells appeared to be eroding the cortical bone. The cortex and periosteum may be violated and soft tissues invaded.

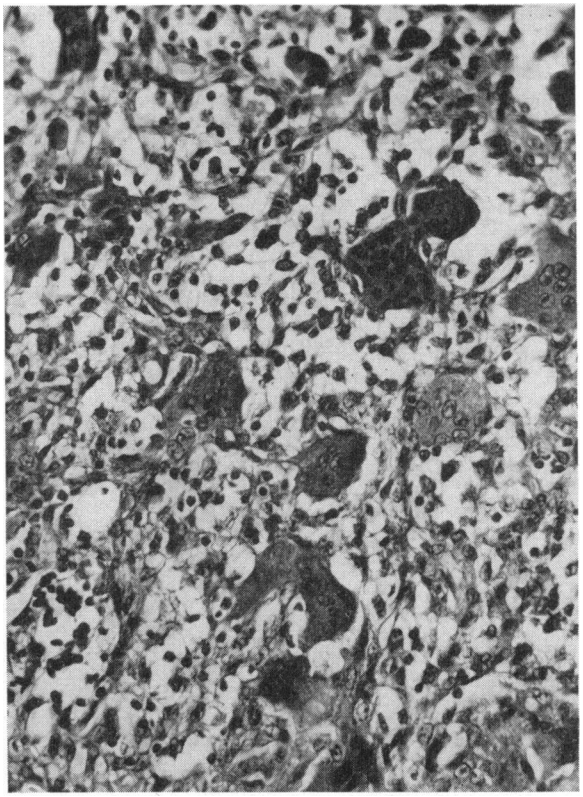

Figure 8.—The giant cells have irregular, angulated margins and clear spaces about them. The stroma is loose and spindleoid (×300).

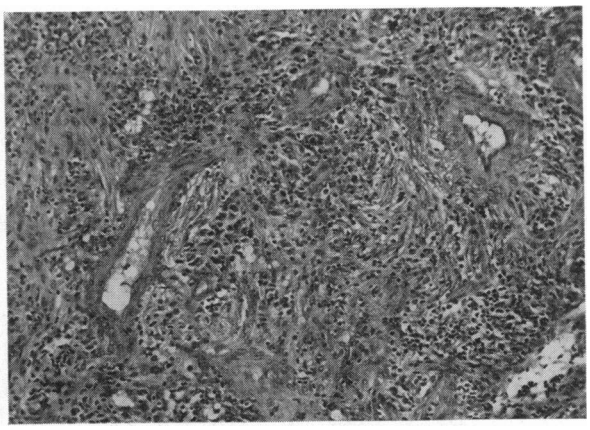

Figure 9.—Note the thick-walled vessels, the collagenized stroma and the small size of the cells (×125).

DISCUSSION

There has been a great deal written about giant cell tumors of bone. Some investigators have been quite strict in the classification[6] of such lesions, excluding all other giant cell lesions as variants—benign chondroblastoma of bone, nonosteogenic fibroma, aneurysmal bone cyst, giant cell tumors of subperiosteal type. These observers also stress that the majority of giant cell tumors of bone are confined to the long bones. Morton[9] expressed the opinion that the true giant cell tumor is being too sharply circumscribed and that it does occur in the humerus, os calcis, in the ribs, vertebrae and sacrum, in the metacarpals and metatarsals and in the maxilla and mandible.

From the time of the first documented description of giant cell lesions, there has been indecision as to whether they are true neoplasms and, if true neoplasms, whether they are benign or malignant. The interest in these tumors has vacillated and the debate as to the benignancy or malignancy has been acrimonious. In 39 of 46 cases reviewed by Nelaton (cited by Coley[2]) the lesions were in the jaws. After Coley's[2] paper there was a gradual acceptance that some of these tumors are malignant. Jaffe's[5] work did much to establish that most giant cell lesions of the jaws are not true giant cell tumors. The authors agree with Lichtenstein,[7] who said: ". . . Until there is general agreement, in actual practice as well as theory, as to what constitutes giant-cell tumor, it seems futile to discuss results of treatment by one method or another—treatment of what, one may ask. Stated more explicitly, if the real giant-cell tumors are freely watered down by other lesions of no serious consequence, then results of treatment by any method can be made to look good."

Treatment of the lesion should be curettement; and, in the case of large lesions, the cavity may be filled with autogenous bone or bone from a bank. Numerous sections should be made of the material

removed, in order that adequate histological study can be carried out.

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Case 2 was submitted to the Registry by Ewald Lonzer, M.D., White Memorial Hospital, Los Angeles.

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